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RN 126341-88-6 REGISTRY

CN Synthase, trehalose (9CI) (CA INDEX NAME)

OTHER NAMES:

CN Trehalose synthase

CN Trehalose synthetase

MF Unspecified

CI MAN

SR CA

LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, CA, CAPLUS, PROMT, TOXLIT,
USPATFULL

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

31 REFERENCES IN FILE CA (1967 TO DATE)

31 REFERENCES IN FILE CAPLUS (1967 TO DATE)

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NiceZyme View of ENZYME: EC 5.4.99.16

Official Name	
Maltose alpha-D-glucosyltransferase.	
Alternative Name(s)	
Trehalose synthase. Maltose glucosylmutase.	
Reaction catalysed	
$\text{Maltose} \rightleftharpoons \alpha, \alpha\text{-trehalose}$	
Cross-References	
BRENDA	5.4.99.16
EMP/PUMA	5.4.99.16
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KYOTO UNIVERSITY LIGAND CHEMICAL DATABASE	5.4.99.16
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BRENDA:5.4.99.16

E.C. number	5.4.99.16 (BRENDA <u>copyright</u> notice)
Original Organism	<div>#1#</div> <u>Thermus aquaticus</u> (ATCC 33923 <3>) <1,3,4> <div>#2#</div> <u>Pimelobacter sp.</u> (strain R48 <2>) <2> <div>#3#</div> <u>Pseudomonas sp.</u> (strain F1 <5>) <5>
Systematic name	Maltose alpha-D-glucosylmutase
Recommended name	Maltose alpha-D-glucosyltransferase
Synonyms	<ul style="list-style-type: none"> ② Synthase, trehalose (Thermus aquaticus strain ATCC33923 clone pBTM5) ② Synthase, trehalose (Saccharomyces cerevisiae gene TSL1 subunit) ② Maltose glucosylmutase ② Trehalose synthase ② Protein (Saccharomyces cerevisiae gene CIF1 reduced) ② 57-KDa trehalose synthase (Saccharomyces cerevisiae) ② Synthase, trehalose (Pimelobacter strain R48 clone pBRM8 gene treS precursor reduced) ② Trehalose synthase (Pimelobacter strain R48 clone pBRM8 gene treS precursor reduced) ② Protein (Saccharomyces cerevisiae clone pMB14 gene CIF reduced) ② Trehalose synthetase ② Maltose alpha-D-glucosylmutase ② Synthase, trehalose (Saccharomyces cerevisiae gene TPS1 subunit) ② Synthase, trehalose

CAS registration number	<p>② 178604-93-8 (synthase, trehalose (Pimelobacter strain R48 clone pBRM8 gene treS precursor reduced) /trehalose synthase (Pimelobacter strain R48 clone pBRM8 gene treS precursor reduced))</p> <p>② 147994-22-7 (protein (Saccharomyces cerevisiae clone pMB14 gene CIF reduced) /57-KDa trehalose synthase (Saccharomyces cerevisiae gene CIF1) /protein (Saccharomyces cerevisiae gene CIF1 reduced) /synthase, trehalose (Saccharomyces cerevisiae gene TPS1 subunit))</p> <p>② 211621-92-0 (synthase, trehalose (Saccharomyces cerevisiae gene TSL1 subunit))</p> <p>② 187285-67-2 (synthase, trehalose (Thermus aquaticus strain ATCC33923 clone pBTM5))</p> <p>② 126341-88-6</p>
Reaction	Maltose = alpha,alpha-trehalose
Reaction type	Glycosyl bond isomerization
Substrates/products	<p>② S: Maltose #1-3# (#2#, r <2>) <1-3,5> P: alpha,alpha-Trehalose #1-3# <1-3,5></p> <p>② S: Sucrose #1# (#1#, activity is very low compared to that with maltose) <3> P: Trehalulose #1# (#1#, i.e. 1-O-alpha-D-glucopyranosyl-D-fructose) <3></p>
Specific activity (micromol/min/mg)	<p>② 135 #1# <1></p> <p>② 41.2 #3# <5></p> <p>② 16.8 #1# <1></p>
Km-value (mM)	<p>② 158 #1# {trehalose} (#1#) <3></p> <p>② 96.5 #1# {sucrose} (#1#) <3></p> <p>② 34.5 #1# {maltose} (#1#) <3></p> <p>② 26 #3# {trehalose} (#3#) <5></p> <p>② 1.1 #3# {maltose} (#3#) <5></p>
pH-optimum	<p>② 8-9 #3# <5></p> <p>② 7.5 #2# <2></p> <p>② 6.5 #1# <1></p>
pH-range	5-7 #1# (#1#, pH 5: about 25% of maximal activity, pH 7: about 55% of maximal activity) <1>

Temperature-optimum (deg.C)	<ul style="list-style-type: none"> 65 #1# <1> 45 #3# <5> 40 #1# (#1#, maximal yield of trehalulose from sucrose) <3> 20 #2# <2>
Inhibitors	<ul style="list-style-type: none"> Cu2+ #1,2# <1,2> Hg2+ #1,2# <1,2> Ni2+ #2# <2> Sucrose #1# (#1#, competitive inhibition of the interconversion between maltose and trehalose) <3> Tris #1,2# <1,2> Zn2+ #1,2# <1,2>
Purification	<ul style="list-style-type: none"> #1# <1> #2# <2> #3# <5>
Molecular Weight	250000 #3# (#3#, gel filtration) <5>
Subunits	<ul style="list-style-type: none"> ? #1# (#1#, x * 105000, SDS-PAGE <1>; #1#, x * 110000, calculation from nucleotide sequence <4>) <1,4> Tetramer #3# (#3#, 4 * 67000, SDS-PAGE) <5>
Cloned	#1# <4>
pH-stability	<ul style="list-style-type: none"> 7-9 #3# (#3#, 37 C, 1 h, stable) <5> 6-9 #2# (#2#, 20 C, 60 min, stable) <2> 5.5-9.5 #1# (#1#, 60 C, 60 min, stable) <1>
Temperature stability (deg.C)	<ul style="list-style-type: none"> 80 #1# (#1#, pH 7.0, 60 min, stable up to) <1> 55 #3# (#3#, pH 7.0, 1 h, stable below) <5> 30 #2# (#2#, pH 7.0, 60 min, stable up to) <2>

References

- <1> Nishimoto, T.; Nakada, T.; Chaen, H.; Fukuda, S.; Sugimoto, T.; Kurimoto, M.; Tsujisaka, Y.: Purification and characterization of a thermostable trehalose synthase from *Thermus aquaticus*:: Biosci. Biotechnol. Biochem., 60; 835-839 (1996) (c)
- <2> Nishimoto, T.; Nakano, M.; Nakada, T.; Chaen, H.; Fukuda, S.; Sugimoto, T.; Kurimoto, M.; Tsujisaka, Y.: Purification and properties of a novel enzyme, trehalose synthase, from *Pimelobacter* sp. R48:: Biosci. Biotechnol. Biochem., 60; 640-644 (1996) (c)
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